

# Developments in the Chemical Industry

By T. W. Delahanty, Assistant Chief, Chemical Division

**S**UBSTANTIAL improvement in the chemical industry occurred during 1934 and further gains were made in the first quarter of the current year. The industry has been quick to respond to the expansion in business activity and has in recent periods preserved the enviable record established during the depression. In part, this relative success has been owing to the initiative of the industry and the constant stream of new products and new uses emanating from the laboratories, which are an important and integral part of the industry.

Table 1.—Production of Chemicals

(Based on the data carried in the Survey of Current Business, excepting the statistics on sulphur, coal tar, phosphate rock, and potash, which represent Bureau of Mines annual totals)

	1933	1934	Percent change
Alcohol:			
Denatured.....1,000 wine gal.	73,810	85,860	+16.3
Ethyl.....1,000 proof gal.	138,180	180,104	+30.4
Methanol:			
Crude.....gal.	3,070,380	3,720,320	+21.0
Synthetic.....gal.	8,708,162	12,634,424	+43.6
Explosives (new orders).....1,000 lb.	349,368	397,385	+13.7
Sulphur.....long tons	1,480,063	1,427,473	-3.5
Sulphuric acid.....short tons	1,346,973	1,579,604	+17.3
Fertilizer, Southern States, consumption			
Superphosphates.....short tons	3,113,187	3,847,292	+23.6
Pine oil.....gal.	2,694,876	2,808,016	+4.3
Resin:			
Gum (resolite).....bbl. 500 lb.	878,898	1,030,374	+17.2
Wood.....bbl. 500 lb.	490,100	508,224	+3.7
Terpentine:			
Gum (resolite).....bbl. 50 gal.	267,692	247,403	-7.6
Wood.....bbl. 50 gal.	68,440	81,088	+18.5
Paints, varnish, and lacquer products (sales) <sup>1</sup> .....1,000 dol.	222,761	262,483	+17.8
Paints:			
Calcimines.....dollars	1,678,498	2,000,546	+19.2
Plastic.....dollars	1,102,163	417,127	-62.2
Cold-water.....dollars	774,004	828,880	+7.1
Cellulose plastic (s, r, and Q):			
Nitrocellulose.....1,000 lb.	11,918	12,800	+7.4
Cellulose acetate.....1,000 lb.	2,484	4,824	+94.2
Coal tar.....1,000 gal.	363,282	416,000	+14.5
Phosphate rock.....long tons	2,309,768	2,877,277	+24.6
Potash (K <sub>2</sub> O).....short tons	142,378	144,842	+1.7

<sup>1</sup> Produced by fertilizer manufacturers.

<sup>2</sup> Represents about 80 percent of total sales.

So rapid have been the developments during recent years that increasing public attention has been drawn to them and this has tended to create the impression that industrial chemicals are of very recent origin. It is perhaps not unusual even today to hear one speak of the American chemical industry as a post-war development acquired from abroad. The domestic industry is, in fact, far from an "infant" industry, as is evident from the American Chemical Industry Tercentenary, which was held in New York during the week of April

22, 1935, in celebration of the three-hundredth anniversary of chemical manufacture in this country.

## Conditions Improved in 1934

While 1934 was not a census year and it is not possible to measure the extent of the gain in the value of products of the industry for that period, sufficient data are available to indicate that production was substantially higher than in the last census year, 1933. Table 1 presents the production statistics for some of the leading items for 1933 and 1934. Numerous products not listed in the table were also produced in larger volume in 1934 than in the preceding year. Alkali output was estimated to have advanced 4 percent in 1934; production of caustic soda was estimated to have been larger than in any other year since 1921, with the exception of 1929. Ammonium-sulphate and coal-distillate production likewise increased, and synthetic camphor production exceeded 30 percent of domestic consumption.

Numerous important chemical industries have not been mentioned in the foregoing paragraph because of the lack of current statistics. An appreciation of the importance of these industries may be obtained by referring to table 2, which presents the summary statistics from the Census of Manufactures for the 2 years, 1931 and 1933.

While it is not evident from this table, it is a fact that the chemical industry made a relatively better showing in 1933 than did manufacturing industries as a whole. For example, the value of output of the chemical and allied industries declined 17 percent, while the products of all manufacturing industries dropped 24 percent in value. Similarly, the average number of wage earners employed during 1933 was 3 percent more than the number employed in 1931, as compared with the recession of 7 percent for all manufacturing industries combined.

Sample data from the Bureau of Labor Statistics reveal the extent of improvement in the volume of employment and pay rolls in the industry in 1934. Average monthly employment for this period was 15 percent in excess of employment during the preceding year and average weekly pay rolls were up 20 percent. Employment in the chemical and allied products

industries in March 1935 was only 2.5 percent less than the average for 1929. Pay rolls were about a fifth less.

#### Profits Larger in All Major Divisions in 1934

Annual reports so far published for the year 1934, representing an important part of the industry, record larger profits in all major divisions, and the few reports available for the first quarter of 1935 reveal relatively favorable results for this period. The 1934 returns for leading companies have been tabulated by a leading New York bank and show the following results:

Five fertilizer concerns, which reported a deficit of 2½ million dollars in 1933, had a profit of over 2 million dollars in 1934. Profits of 8 paint and varnish producers were 7 million dollars in 1934, or 7.1 percent greater than in the preceding year. Twenty drug and sundry firms reported profits of 37½ million dollars, 24 percent greater than in 1933. Twenty-five industrial chemical producers had a profit of 117½ million dollars, 21 percent more than in 1933. While the performance of these leading companies may have been above the average, there is little doubt that results for the entire industry were superior to those of 1933.

The rising volume of business and profits, together with new developments, resulted in a noteworthy program of construction and modernization in 1934. Among the new plants completed or under construction were the 3 exceedingly large alkali and 2 new sulphur plants located in the South, 3 titanium pigment plants,

Table 2.—The Chemical and Related Industries (Bureau of the Census)

Industry	Number of establishments <sup>1</sup>		Wage earners, average for year <sup>1</sup>		Value of products (thousands of dollars)	
	1931	1933	1931	1933 <sup>2</sup>	1931	1933
Alcohol, ethyl, and distilled liquors.....	27	51	997	2,534	21,741	60,838
Baking powders, yeast, etc.....	45	40	2,881	2,869	47,027	31,976
Blackings, stains, dressings.....	150	154	1,601	1,625	20,343	13,060
Bluing.....	20	16	95	77	1,179	1,033
Boss black, carbon black, lamp black.....	62	46	1,030	1,449	9,535	8,887
Chemicals, not elsewhere classified.....	558	541	48,523	51,190	833,175	478,593
Cleaning and polishing preparations.....	358	327	2,430	2,755	48,007	41,948
Compressed and liquefied gases.....	240	236	3,844	2,703	41,808	22,007
Druggists' preparations.....	449	411	14,067	12,020	173,307	146,770
Drug grinding.....	22	22	601	620	9,180	8,390
Explosives.....	79	66	4,733	4,168	45,258	36,106
Fertilizers.....	590	522	14,451	13,053	144,360	94,839
Glass and gelatin.....	72	63	2,439	2,012	37,610	17,143
Ink, printing.....	171	150	2,347	2,004	25,189	20,168
Linseed oil, cake, and meal.....	28	22	1,237	1,525	62,863	40,403
Oils, essential.....	12	12	128	176	2,505	3,004
Paints and varnishes.....	1,069	981	22,521	22,893	390,720	230,443
Patent and proprietary compounds.....	1,249	905	3,685	3,790	153,318	125,145
Perfumes, cosmetics, toilet preparations.....	568	406	10,025	8,978	153,318	96,040
Tanning materials, dyestuffs, etc.....	116	124	1,062	2,141	25,439	23,322
Turpentine and rosin.....	963	843	28,267	20,285	15,508	16,427
Wood distillation and charcoal manufacture.....	63	54	2,544	2,781	11,440	11,034
Matches.....	10	18	3,369	4,720	15,473	25,373

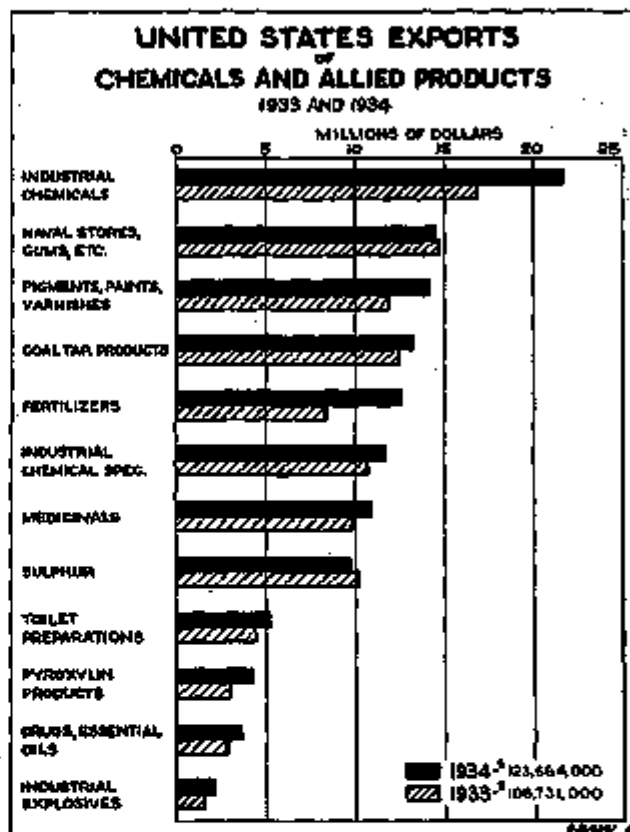
<sup>1</sup> This item is an average of the numbers reported for the several months of the year. In calculating it, equal weight must be given to full-time and part-time wage earners (not reported separately by the manufacturers), and for this reason it exceeds the number that would have been required to perform the work done in the industries if all wage earners had been continuously employed.

<sup>2</sup> Revised; comparable with 1933.

a second potash plant, 4 synthetic organic chemical establishments, and the first commercial plant in this country for the manufacture of urea.

#### Technological Progress

Technological progress during the past year resulted not only in the introduction of new products, but also permitted the greater utilization of waste materials and a wider and more intelligent use of existing materials. It is possible to cite only a few of what are apparently the significant technological developments.



Bromine, for example, formerly extracted from interior salt-well brines is now extracted from sea water; synthetic resins, a spectacular coal-tar development of years of study, now draws upon petroleum and other non-coal-tar materials with the resultant wider variety and specification possibilities. Textile detergent requirements (soaps) may now be met by sulphated higher alcohols. New solvents have recently been evolved and have entered consumption on a tonnage basis. Synthetic rubber, which up to 1934 was a pilot plant product, has blossomed into large scale production and chemically-treated rubber finds new outlets in paint and other channels. Solid carbon dioxide, which has been meeting refrigeration requirements in numerous outlets, now faces a competitive development; crystal urea, a highly concentrated nitrogenous requisite for fertilizers, has become a tonnage reality; cellulose nitrate, the inflammable base of pyroxylin plastics, encounters the competition of the growing cellulose acetate industry, and potassium carbonate formerly imported is now made in the United States.

Boron carbide, an abrasive akin to the diamond in hardness, is now commercially available, and sodium oxide, a concentrated alkali, may become an interesting new material for varied processing. Oligodynamy, an old scientific principle, has now become an acquisition to branches of industry concerned with bacteriological control.

#### Foreign Sales Expanded

The expansion of sales of domestic chemical products in 1934 was not confined to the United States. American chemical products were exported to many markets throughout the world to the amount of \$124,000,000, a figure which was, however, less than the exports in any year since 1922, except 1933.

Increased production of chemicals, and the expansion in manufacturing activity generally, has created an increased demand for imported chemicals and chemical raw materials not available in the United States in adequate quantity. However, the gradual shift to the use of synthetic domestic products in the place of natural products has tended to reduce imports during the past 4 years and may permanently alter the volume of imports. Imports valued at \$96,400,000 in 1934 were more than in 1933 and 1932 but less than in other recent years.

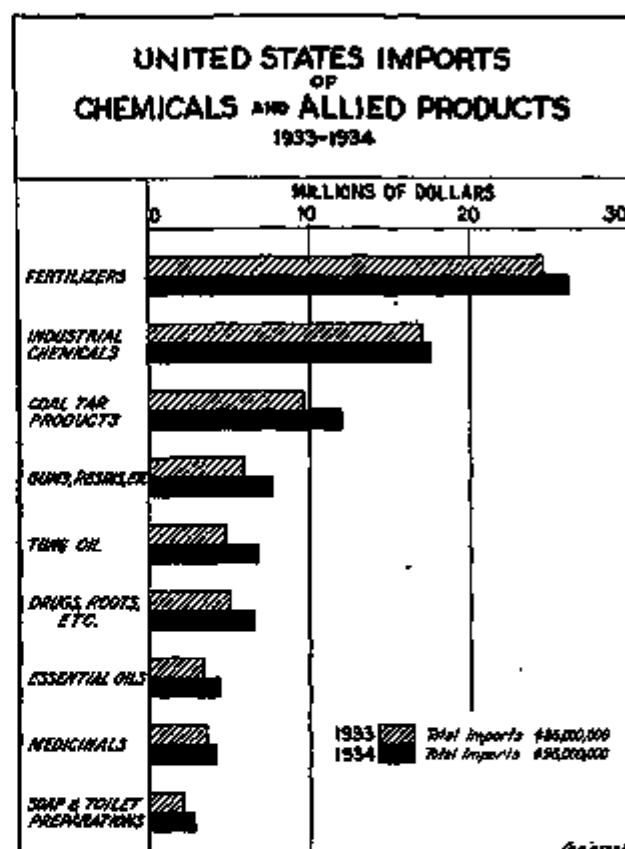
Although in examining the chart of exports of chemicals by major groups, consideration must be given to the difference in prices during the 2 years, nevertheless, there were many gains in the volume of individual commodities exported. Some of the largest increases in exports of industrial chemicals in 1934 were in calcium chloride, which nearly doubled in quantity, in sodium and potassium compounds, organic and inorganic acids, aluminum sulphate, and copper sulphate. Commodities included under the industrial chemical specialties class which recorded quantity gains were nicotine sulphate, lead arsenate, other agricultural insecticides, household insecticides, disinfectants and similar preparations, petrolsum jelly, dextrine, rubber compounding agents, cementing preparations, metal-working compounds, and automobile polishes.

In the paint group, exports of ready mixed paints, stains, and enamels were up 50 percent in quantity in 1934 as compared with 1933. All classes comprising the fertilizer group gained in tonnage. Larger quantities of essential oils were sold abroad.

#### Shifts in Import Trade

Among significant developments in the import trade were: The substantial decline in receipts of ammonium sulphate from the record imports of 1933; the

gain in imports of sodium nitrate after 2 years of relatively small receipts, the continued rise in imports of cyanamide from Canada; the sharp drop in incoming shipments of guano as a result of the failure to obtain supplies from Peru; the spectacular increase in imports of "other nitrogenous materials" due chiefly to added imports of ammonium nitrate type fertilizers; and in the industrial chemical group, to the decline in



imports of a comparatively large number of individual commodities which recorded the lowest volumes imported for the past 10 years.

This review is based largely on material gathered for use in a forthcoming Trade Information Bulletin No. 823 entitled "World Chemical Developments in 1934." In addition to the factual presentation on the domestic chemical industry, information is also provided in this bulletin relative to our principal industrial competitors and markets. Developments in 46 countries are reviewed and 25 countries are treated extensively. Soviet Russia and the South American Republics are stressed—the former as a new competitor and the latter as a market which is progressing industrially.

It is expected that this Bulletin will be available for distribution early in June.